

(19)



JAPANESE PATENT OFFICE

PATENT ABSTRACTS OF JAPAN

(11) Publication number: 10027633 A

(43) Date of publication of application: 27.01.1998

(51) Int. Cl. H01R 4/24

(21) Application number: 08181048

(22) Date of filing: 10.07.1996

(71) Applicant: MATSUSHITA ELECTRIC WORKS LTD

(72) Inventor: IWAMOTO KINYA
INOUE HIROO
MASAGAKI YOSHIHIRO

(54) CONNECTOR FOR PATCH PANEL

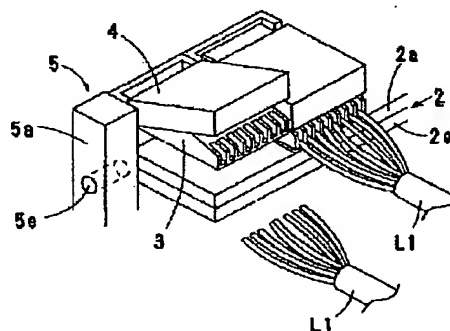
(57) Abstract:

PROBLEM TO BE SOLVED: To provide a connector for a patch panel which can connect the connector for the patch panel and a wire of a cable without using a tool.

SOLUTION: This connector comprises a terminal metal fixture having a press contact part press contact connecting a single wire of a bundle of a wire L1 and a press contact part connecting a patch plug, storage case 2 storing the terminal metal fixture successively provided with a prescribed space, case holding part 5 for holding the storage case 2 and for setting it to a prescribed position, pressing part 3 pressing the wire

toward the press contact part and a press handle 4 journaled to the storage case 2 to press the pressing part.

COPYRIGHT: (C)1998,JPO



BEST AVAILABLE COPY

OPIC
Office of Patents
Industrie Canada

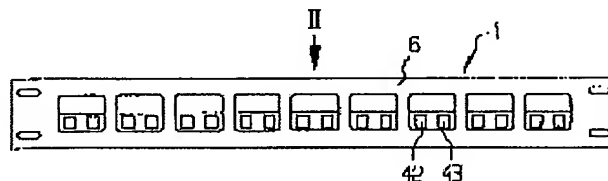


CIPPO
Canadian Intellectual
Property Office

(12) (13) (24) **Demande-Application**

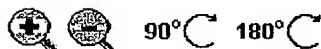
(21) (A1) **2,276,633**
(22) 1999/06/29
(43) 2000/01/01

(72) DZYCK, WOLFGANG, DE
(72) MOESER, HARALD, DE
(71) SIEMENS AKTIENGESELLSCHAFT, DE
(51) Int. Cl.⁶ H01R 13/648, H01R 9/22
(30) 1998/07/01 (19829485.9) DE
(54) SYSTEME POUVANT FOURNIR UNE CONNEXION
ELECTRIQUE EN VUE DE LA TRANSMISSION DE DONNEES
ET COMPOSANTS DE CE SYSTEME
(54) SYSTEM FOR PROVIDING AN ELECTRICAL CONNECTION
FOR THE TRANSMISSION OF DATA, AND COMPONENTS OF
THIS SYSTEM



(57) The system and components for an electrical connection for the transmission of data, have a cable and a socket, where a plug-in connector and its cable connection area are surrounded on all sides by an electromagnetic shielding. The cable is connected with the plug-in connector in the cable connection area of the socket. A further cable (61) with a mating plug-in connector is plugged into the plug-in connector of the socket. A patch panel (1) has one or more plug-in connectors (40). A cable connection area (5) of the patch panel (1) is surrounded on each of the plug-in connectors (40). Each of the plug-in connectors (40) and its cable connection area (5) is surrounded on all sides by an electromagnetic shielding. Leads (62) of the additional cable (61) are connected with one of the plug-in connectors (40) in the cable connection area (5) of the patch panel (1), or a second mating plug-in connector of the additional cable (61) is plugged into a plug-in connector (40) of the patch panel (1).

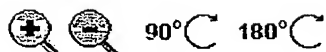
Industrie Canada Industry Canada



CA 02276633 1999-06-29

ABSTRACT OF THE DISCLOSURE

The system and components for an electrical connection for the transmission of data, have a cable and a socket, where a plug-in connector and its cable connection area are surrounded on all sides by an electromagnetic shielding. The cable is connected with the plug-in connector in the cable connection area of the socket. A further cable (61) with a mating plug-in connector is plugged into the plug-in connector of the socket. A patch panel (1) has one or more plug-in connectors (40). A cable connection area (5) of the patch panel (1) is allocated to each of the plug-in connectors (40). Each of the plug-in connectors (40) and its cable connection area (5) is surrounded on all sides by an electromagnetic shielding. Leads (62) of the additional cable (61) are connected with one of the plug-in connectors (40) in the cable connection area (5) of the patch panel (1), or a second mating plug-in connector of the additional cable (61) is plugged into a plug-in connector (40) of the patch panel (1).



CA 02276633 1999-06-19

SPECIFICATION

TITLE

**SYSTEM FOR PROVIDING AN ELECTRICAL CONNECTION FOR THE
TRANSMISSION OF DATA, AND COMPONENTS OF THIS SYSTEM****BACKGROUND OF THE INVENTION**

System for providing an electrical connection for the transmission of data, and components of this system.

The present invention relates to a system for providing an electrical connection for the transmission of data, a patch panel for the connection of cables, a socket, and a plug-in connector, whereby these same components can be used in the system.

In general, a patch panel is a connection means that is used in the connection or, respectively, networking of terminal apparatuses, in order for example to connect an incoming data cable with several outgoing data cables. In order to determine a particular connection between a terminal apparatus, for example a printer, and another terminal apparatus, for example a personal computer, a particular plug-in connection can be set up at the patch panel, or the leads of a cable, for example coming from a wall data outlet, can be provided lead-by-lead at the patch panel, for example by means of a clamped or kinked contacting. In current connection systems with data transmission rates of tens to hundreds of megabits, or even gigabits, that is, in the radio-frequency range, high electromagnetic RF radiation results at the contact points, for example, at the patch panel or at the wall socket, due to exposed cable leads and incorrect installation of the metal shielding of the cable, or to excessively high contact resistances, which radiation can cause disturbances in apparatuses in the spatial vicinity of, for example, the patch panel. In addition, unwanted cross-talk couplings can

-1-





CA 02276633 1999-06-29

occur in adjacent cable connection areas at the patch panel, which can lead in turn to disturbances of the data signals transmitted via the patch panel, and thus to a reduction of the range of the data transmission in the disturbed cable.

SUMMARY OF THE INVENTION

The object of the present invention is to indicate a connection system with a patch panel in which the above-explained disturbances due to electromagnetic RF radiation at the connection means of the system can be at least greatly reduced.

Accordingly, the inventive patch panel has, for the connection of cables, in particular of data cables, a front side, a back side, several openings, and one or more plug-in connectors that are respectively fastened to the patch panel in accessible fashion, via one of the openings, from the front side of the patch panel for the plugging of a mating plug-in connector. A cable connection area on the back side of the patch panel is allocated to each of the plug-in connectors. Each of the plug-in connectors and its cable connection area is surrounded on all sides by an electromagnetic shielding, in particular at the back side of the patch panel.

The inventive patch panel has the considerable advantage that by means of the electromagnetic shielding, on all sides, of the respective plug-in connector, or, respectively, of its plug-in connector location, and of its respectively associated cable connection area, an electromagnetic radiation, in particular of radio-frequency energy, at the exposed cable leads and contacts in the cable connection area and in the plug-in connector area is securely enclosed or, respectively, shielded. Due to the separation, achieved by the shielding, from adjacent cable connection and plug-in connector areas, a disturbing cross-talk coupling into adjacent cables, cable connection areas, contacts



CA 02276633 1999-08-29

and plug-in connectors is avoided, or is at least strongly suppressed. In turn, this has the consequence that the electrical signals in cables at the patch panel are more free from disturbance, and can thus be transmitted over a large distance, or, respectively, a distance greater than was the case in the prior art. In addition, the advantageous shielding of the inventive patch panel enables a suppression of electromagnetic radiation in the spatial surroundings of the patch panel, thus avoiding disturbances of apparatuses in the vicinity of the patch panel.

The shielding preferably has one or more individual shielding caps that respectively surround a plug-in connector and its associated cable connection area, whereby a modular equipping of the patch panel is enabled.

An insert is preferably arranged in each opening of the inventive patch panel, in each of which inserts a plug-in connector of the patch panel can preferably be placed, whereby the insert is arranged inside the shielding. The insert enables a precise centering, mounting and insulation, if a plastic insert is used, and a positively locking arrangement of a plug-in connector at the patch panel. In addition, the insert contributes to the ability to equip the patch panel in a modular fashion.

Each of the plug-in connectors is preferably held fast in the insert by a snap connection, which enables the plug-in connector to be plugged to the patch panel.

The patch panel preferably has an angled sheet metal part with a front part that extends vertically at the front side of the patch panel and a base part that extends horizontally at the back side of the patch panel, whereby the openings are fashioned in the front part and the angled sheet metal part forms a part of the shielding. Together with the individual shielding caps, the angled sheet metal part enables an effective



CA 02276633 1999-06-29

shielding, particularly in the RF range.

A reinforcing part is preferably provided on the back side of the patch panel between the front part and the base part. The reinforcing part enables a stabilization of the relatively elongated angled sheet metal part, and in addition provides an additional surface for the shielding contacting.

A front plate, which holds the plug-in connectors fast on the angled sheet metal part, or additionally stops them, can be fastened on the angled sheet metal part. The front plate enables a fitting pressure on the plug-in connectors in the patch panel, whereby a reliable contacting of a shielding plate of the plug-in connector with the angled sheet metal part is realized.

The front plate is preferably fastened to the angled sheet metal part by means of a snap connection, enabling a simple attachment and removal of the front plate to and from the angled sheet metal part. In addition, the snap connection ensures a reliable fitting pressure on the plug-in connectors along the entire front side of the angled sheet metal part.

On the back side, the inventive patch panel preferably has at least one cable carrier as support for a cable, thus avoiding an unwanted kinking of the cable, particularly in the cable connection area, which can otherwise lead to an increased damping or damage of cable leads, or also of the metal sheath of the cable.

Preferably, the plug-in connector has at least one plug-in jack for receiving a plug on the front side of the patch panel, and a terminal strip on the back side of the patch panel for fastening the leads of a cable in the cable connection area.



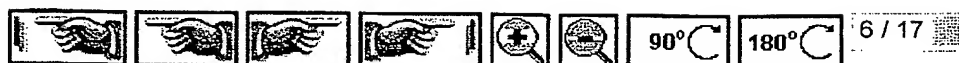
CA 02276633 1999-06-29

The inventive socket has at least one plug-in connector that is fastened, through an opening on a front side of the socket, in the socket in accessible fashion for the plugging of a mating plug-in connector. A cable connection area is provided in the interior of the socket. The plug-in connector and the cable connection area is surrounded on all sides by an electromagnetic shielding.

The inventive socket has the advantage that by means of the electromagnetic shielding, on all sides, of the plug-in connector or, respectively, of its plug-in connection location, and of its associated cable connection area, an electromagnetic radiation, in particular of RF energy, at the exposed cable leads and contacts in the cable connection area and in the plug-in connector area is reliably trapped or, respectively, shielded. By this means, a suppression of electromagnetic radiation in the spatial environment of the socket is enabled, whereby disturbances of equipment in the vicinity of the socket are avoided.

The shielding preferably comprises a shielding cover that is arranged on a back side of the socket and that surrounds the entire socket on the back side. The shielding cover thus enables a reliable and cost-saving shielding, in particular of the plug-in connector and of the cable connection area on the back side of the socket.

An insert is preferably arranged in the socket, into which insert the plug-in connector can be placed through its opening, whereby the insert is located inside the shielding. As in the inventive patch panel, the insert enables a precise centering, mounting, insulation (if a plastic insert is used), and a positively locking arrangement of the plug-in connector in the socket. In addition, the insert contributes to the ability to equip the patch panel in a modular fashion.



CA 02276633 1999-06-29

The plug-in connector is preferably held fast in the insert by a snap connection, enabling the plug-in connector to be plugged in the socket.

Preferably, a sheet metal bent part is provided in the socket as a part of the shielding, in order also to ensure a front-side shielding in particular of the cable connection area in the opening of the socket.

The sheet metal bent part is preferably fastened to the socket by means of a snap connection, in order in particular to achieve an ability to plug the bent metal part.

The sheet metal bent part can preferably be placed into the socket from the front side of the socket, in order to achieve a cost-saving assembly of the socket in a modular fashion.

The sheet metal bent part preferably has a means, for example, a cable clamp or a cable binder, in order to provide a securing of a cable to the sheet metal bent part or, respectively, to the socket in the cable connection area still inside the shielding.

The plug-in connector preferably has at least one accessible socket for receiving a (mating) plug on the front side of the socket, and a terminal strip on the back side of the socket for fastening the leads of a cable in the cable connection area, in order to give the plug-in connector versatility of use.

The socket is preferably designed as a flush-type box, so that it will be correspondingly reliable to use.

The inventive plug-in connector for use in a patch panel comprises at least one accessible jack for receiving a (mating) plug on a front side of the plug-in connector, a terminal strip or contacting means on a back side of the plug-in connector for fastening the leads of a cable, and an electromagnetic shielding plate.



CA 02276633 1999-06-19

The inventive plug-in connector has the advantage that the shielding plate provides a contacting with the shielding, for example of the patch panel or of the socket, with a low contact resistance.

The inventive plug-in connector preferably has a snap means for the pluggable fastening of the plug-in connector, for example, in the patch panel or in the socket.

The inventive plug-in connector preferably has a jack part with at least one jack and a terminal strip part with the terminal strip, whereby the jack part and the terminal strip part are designed as parts that can be joined together and separated. The two-part design of the inventive plug-in connector has the advantage of a simple assembly of the plug-in connector itself and the cost-saving and modular fastening of the plug-in connector to the patch panel or to a socket.

Snap means are preferably fashioned on the terminal strip part and/or on the jack part in order to enable a pluggable fastening of the plug-in connector, and also of its individual parts, on the patch panel and/or the socket.

The shielding plate is preferably fastened on the jack part, in order to achieve a compact construction.

The inventive system for the provision of an electrical connection for transmitting data comprises a first cable that has several electrically conductive leads, a socket with at least one plug-in connector fastened in the socket in accessible fashion, through an opening on the front side of the socket, for the plugging of a mating plug-in connector. A cable connection area is provided in the interior of the socket. The plug-in connector and the cable connection area is surrounded on all sides by an electromagnetic shielding. The leads of the first cable are connected with the plug-in connector in the



CA 02276633 1999-06-29

cable connection area of the socket, a second cable with several electrically conductive leads and with a mating plug-in connector that is plugged into the plug-in connector of the socket at the front side, a patch panel that comprises a front side, a back side, several openings, and one or more plug-in connectors that are respectively fastened to the patch panel in accessible fashion, from the front side of the patch panel via one of the openings, for the plugging of a mating plug-in connector. A cable connection area on the back side of the patch panel is allocated to each of the plug-in connectors. Each of the plug-in connectors and its cable connection area is surrounded on all sides by an electromagnetic shielding. The leads of the second cable are connected with one of the plug-in connectors of the patch panel in the cable connection area of the plug-in connector, or a second mating plug-in connector of the second cable is plugged into a plug-in connector on the front side of the patch panel.

The inventive system comprises the above-explained inventive components, such as the patch panel, socket and plug-in connector, and consequently also comprises the sum of the advantages thereof. The inventive system thus provides a link for the transmission of data, whereby an electromagnetic radiation, in particular of RF energy, at the exposed cable leads and contacts in the cable connection area and in the plug-in connector area of the link is trapped or shielded by the shieldings of the system components. Due to the separation (achieved by the shieldings) from adjacent cable connection and plug-in connector areas, a disturbing cross-talk coupling into adjacent cables, cable connection areas, contacts and plug-in connectors of the system is avoided or at least strongly suppressed. The electrical signals in cables of the inventive system are thus more free of disturbances, and can thus be transmitted over



CA 02276633 1999-06-29

a broad distance, or, respectively, a distance broader than was the case in the prior art. In addition, the advantageous shieldings of the system components enable a suppression of electromagnetic radiation in the spatial surroundings of the system, whereby disturbances of equipment in the surrounding environment of the system are avoided.

Preferably, the plug-in connectors and the associated inserts of the patch panel and the plug-in connector and the insert of the socket have the same construction, whereby an extensive modular construction and a component exchangeability of the patch panel and of the socket are enabled.

BRIEF DESCRIPTION OF THE DRAWINGS

The features of the present invention which are believed to be novel, are set forth with particularity in the appended claims. The invention, together with further objects and advantages, may best be understood by reference to the following description taken in conjunction with the accompanying drawings, in the several Figures of which like reference numerals identify like elements, and in which:

- Figure 1 shows a frontal view of an embodiment of the inventive patch panel for use in an embodiment of the inventive system;
- Figure 2 shows a top view of the inventive patch panel according to Figure 1, seen in the direction of the arrow II in Figure 1, but without the front plate;
- Figure 3 shows a perspective view of a detail, namely a shielding cap, of the patch panel of Figures 1 and 2;
- Figure 4 shows a side view of a plug-in connector for use in the embodiment in the inventive system;



CA 02276633 1999-06-29

- Figure 5 shows a cross-sectional view through the patch panel of Figures 1 to 3, seen along the sectional line V of Figure 2, with a drawn-in shielding cap of Figure 3;
- Figure 6 shows a detail view (namely an insert of the patch panel of Figure 5), seen in the direction of the arrow VI in Figure 5;
- Figure 7 shows a further detail view, partly in cross-section, namely of the insert of Figure 6 with inserted plug-in connector of Figure 4, seen in the direction of the arrow VI of Figure 6;
- Figure 8 shows a partial cross-sectional view of an embodiment of the inventive socket for use in the inventive system, with a drawn-in plug-in connector of Figure 4 and closed cable end segment; and
- Figure 9 shows a back view of the socket of Figure 8, seen in the direction of the arrow IX of Figure 8, but without the plug-in connector.

DESCRIPTION OF THE PREFERRED EMBODIMENT

An embodiment of the inventive system comprises at least one inventive patch panel 1 (see Figures 1 to 3 and Figures 5 to 7) having at least one inventive plug-in connector 40 (see Figure 4), an inventive socket 50 with a plug-in connector 51 (see Figures 8 and 9), a first data cable 52 whose leads are connected with the plug-in connector 51 inside a cable connection area 55 of the socket 50, and a second data cable 61 (see Figure 5) that connects the plug-in connector 51 of the socket 50 with the plug-in connector 40 of the patch panel 1. The second data cable 61 has, at one end, a mating plug (not shown) that fits into a jack 42, 43 of the plug-in connector 51 of the socket 50, and is contacted at the other end with the plug-in connector 40 of the patch



CA 02276633 1999-06-29

panel 1 with its leads, freed from the cable cladding, in a cable connection area 5 of the patch panel 1. The plug-in connectors 51 and 40 are of identical construction.

The patch panel 1 of Figures 1 to 7 comprises an angled sheet metal part 30, a front plate 6 that is fastened to the angled sheet metal part 30, one or more plug-in connectors 40 that are arranged alongside one another in a row in the patch panel 1 at corresponding plug-in connectors locations, and a number of individual shielding caps 10 corresponding to the number of installed plug-in connectors 40, one such cap being shown in detail in Figure 3. The elongated angled sheet metal part 30, which is of continuous construction, is designed as a sheet metal bent part, and has a front part 31 that extends vertically and a base part 32 that extends horizontally.

The front part 31 has one front part opening 33 per plug-in connector 40 that is open towards a front side 2 of the patch panel 1 or, respectively, is accessible from the front side 2 of the patch panel 1. The base part 32 of the one-piece angled sheet metal part 30 encloses the patch panel 1 completely towards the bottom, and has several cable carriers 7 fashioned as extensions, whose number corresponds to the number of provided plug-in connector locations of the patch panel 1, that is, nine cable carriers 7 in the embodiment shown. The respective end of the data cable 61 rests at least partly on the cable carrier 7, in order to avoid a kinking of the data cable 61, at least in the cable connection area 5 of the patch panel 1. On the back side on the front part 31, a reinforcement part 34, which serves to stabilize the angled sheet metal part 30, is fastened to the front part 31 and to the base part 32. The reinforcement part 34 has an opening 35 that is oriented flush with the opening 33 of the front part.



CA 02276633 1999-06-29

An insert 20 is introduced into the openings 33 and 35 from the front side 2 of the patch panel 1. The insert 20 is made of plastic and has, on its inner upper side, a snap projection 21, stops 23, and, arranged laterally on the inside wall, two snap projections 22 lying opposite one another. The insert 20 is open at the front and back sides, and is provided for the reception of the plug-in connector 40. One insert 20 is also provided per plug location.

On the front side 2 of the patch panel 1, the front plate 6 is fastened by means of a snap connection, whereby the front plate 6 encloses the front part 31 of the angled sheet metal part 30 at the upper side with a hook 65, and the front plate 6 engages in a snap recess 25 of the angled sheet metal part 30 with a snap projection 8. The front plate 6 has in turn one front plate opening 9 per plug-in connector location, which is however displaced somewhat in relation to the openings 33 and 35, so that when the front plate 6 is attached a pressure is exerted on the plug-in connectors 40.

One plug-in connector 40 can be placed in each of the inserts 20. The plug-in connector 40 comprises a jack part 41 and a terminal strip part 44 that can be joined together and separated from one another.

The jack part 41 has, on the front side, two jacks 42 and 43 that are located alongside one another and are of the same size, into which corresponding mating plugs of cables fit. A shielding plate 60 is attached to the housing of the jack part 41, which plate is pressed against the front side of the front part of the angled sheet metal part 30 when the plug-in connector 40 is inserted into the insert 20, in order to create a secure ground contact with the angled sheet metal part 30. The jack part 41 has a circuit board 49 that stands off at the back side, on which the contacts of the jack part



CA 02276633 1999-06-29

41 are fashioned so as to be exposed. In addition, the Jack part 41 has snap springs 46 that create a snap connection with the snap projections 22 of the insert 20 when the plug-in connector 40 is plugged in. The jack part 41 can for example be designed as an SML insert.

The terminal strip part 44 has on the front side a jack 48 into which the circuit board 49 can be fitted by plugging, and has on the back side a terminal strip 47 with clamp contacts located alongside one another, which contacts are continued in the jack 48 inside the terminal strip part 44, in order to make contact with corresponding contacts of the circuit board 49 of the jack part 41, whereby overall a continuous electrically conductive connection is provided between a contact of the terminal strip 47 and a contact inside the socket 42 or, respectively, 43. The leads 82 of the data cable 81 are hooked into the clamp contacts of the terminal strip 47 and are held fast by means of a clamp part of the terminal strip 47 that applies the necessary contact pressure. A snap spring 45 is fashioned on the terminal strip part 44, which, when the plug-in connector 40 is placed in the insert 20, forms a secure snap connection together with the snap projection 21 of the insert 20 and the stops 23 for the terminal strip part 44. The terminal strip part 44 can be fashioned as an EDGE contact.

On the back side of the Insert 20 or, respectively, the plug-in connector 40 inserted therein, a cable connection area 5 is provided in which the data cable 81 extends with its end, at least for a part or a segment, and in which the leads 82 of the data cable 81 are fastened on the terminal strip 47 of the plug-in connector 40. The data cable 81 is for example fastened to the cable carrier 7 by means of a cable clip (not shown in Figure 5). A metal sheath of the data cable 81 is likewise connected with



CA 02276633 1999-06-29

the angled sheet metal part 30 inside the cable connection area 5.

On the back side of the patch panel 1, the insert 20 and the associated cable connection area 5 is shielded by means of the shielding cap 10, which covers opposite side walls 12 and 13, a roof wall 16 and a back wall 14, and engages, with a hook 15, in an associated eye on the angled sheet metal part 30 or, respectively, on the reinforcement part 34 on the upper side, for fastening. The plug-in connector 40 and the associated cable connection area 5 are thereby surrounded on all sides by metallic shielding walls of the shielding cap 10 and of the angled sheet metal part 30, whereby the access to the jacks 42, 43 of the plug-in connector 40 is exposed. Due to the all-around shielding by means of the shielding cap 10 and the angled sheet metal part 30, electromagnetic RF radiation occurring in the cable connection area 5 can no longer reach adjacent plug-in connectors 40, whereby cross-talk attenuation or disturbances connected therewith are avoided. Thus, according to the present embodiment a maximum of nine plug-in connector locations can be provided on the patch panel 1, and a corresponding number of shielding caps 10 can be installed in modular fashion. A reliable ground contact with a low contact resistance between the shielding caps 10 and the continuous angled sheet metal part 30 can for example be created by fastening pins and clamps. The patch panel 1 is constructed as a drawer in a 19-inch location of a corresponding 19-inch cabinet.

All metal parts of the patch panel 1, that is, the front plate 6, the angled sheet metal part 30, the reinforcement part 34 and the shielding caps 10 are made of high-grade steel, for example, X Cr 17 or X6 Cr 17 (Remanit), with a particularly smoothly milled surface, so that additional contact resistances due to recesses in the material,



CA 02276633 1999-06-29

a rough surface, or other disadvantageous surface treatments, are avoided.

The assembly of the patch panel 1 is explained below on the basis of a plug-in connector 40. The insert 20 is inserted from the front side 2 of the patch panel 1 through the opening 4 and the openings 33 and 35. Subsequently, the leads 62 of the data cable 61 are clamped onto the terminal strip 47 of the terminal strip part 44 inside the cable connection area 5. Subsequently, at the back side 3 of the patch panel 1 the terminal strip part 44 of the plug-in connector 40 is inserted into the back side of the insert 20, until the snap spring 45 snaps into the snap projection 21 of the insert 20, and the terminal strip part 44 comes to rest on the stops 23 of the insert 20. The cable 61 is fastened to the cable carrier 7 by means of the cable clip. The shielding cap 10 is hung on the back side 3 of the patch panel 1 by means of its hook 15, and its back wall 14 thereby comes to rest at least partly on the cable carrier 7. The data cable 61 thereby extends through a cap opening 11 that is fashioned in the back wall 14 of the shielding cap 10. From the front side 2 of the patch panel 1, the jack part 41 of the plug-in connector 40 is then introduced into the insert 20, whereby the circuit board 49 is inserted into the jack 48 of the terminal strip part 41 until the snap springs 46 of the jack part 41 create a snap connection with the snap projections 22 of the insert 20. The shielding plate 60 of the plug-in connector 40 is thereby pressed against the front side of the front part 31 of the angled sheet metal part 30, in order to set up a contact between the angled sheet metal part 30 and the shielding plate 60, that is, the plug-in connector 40. Subsequently, the front plate 6 is attached to the front side of the patch panel 1 by means of the snap connection of the snap recess 25 and the snap projection 8, whereby an additional pressure is exerted on the front side of the plug-in connector



CA 02276633 1999-06-29

40 by the front plate 6. Cables with corresponding mating plugs or, respectively, plugs can now be inserted into the jacks 42, 43, in order to create additional connections.

The inventive socket 50 is for example fashioned as a flush-type box for wall mounting with a flush-type frame 64, and essentially comprises the plug-in connector 51, which is identical to the plug-in connector 40, a plastic insert 57 that is identical to the insert 20 of the patch panel 1, a sheet metal bent part 55 and a shielding cover 59 that is arranged on the back side of the socket 50, and the plug-in connector 51, a cable connection area 56 that is provided at the back side inside the shielding cover 59, and that surrounds the sheet metal bent part 55 at the back side. The shielding cover 59 and the sheet metal bent part 55, which occupies the interior space (adjacent to the cable connection area 56 and to the insert 57) of the socket 50 up to the height of the flush-type frame 64, form the shielding of the socket 50. In the cable connection area 56, the leads of the first data cable 52 are clamped to the terminal strip 47 of the plug-in connector 51, whereby the data cable 52 is secured to the back side of the sheet metal bent part 55 with a cable clip 53. A cable binder 66 additionally secures the first data cable 52 to a fastening projection 54 of the sheet metal bent part 55 in strain-relieved fashion. The sheet metal bent part 55 and the insert 57 can be inserted through the opening 58 of the socket 50, whereby snap connections hold the sheet metal bent part 55 and the insert 57 on the flush-type frame 64. The shielding cover 59 is fastened to the flush-type frame 64, for example, by means of brackets, pins or screws and the like, or also in positively locking fashion. When the plug-in connector 51 is snapped into place, the shielding plate 80 of the plug-in connector 51 is pressed against the sheet metal bent part 55 for the contact switching. The metal parts of the socket 50, that is,

-16-



CA 02276633 1999-06-19

the sheet metal bent part 55 and the shielding cover 59, are also made of the high-grade steel with a smoothly milled surface, mentioned above in connection with the patch panel 1. A guide opening 53 for the cable 52 is provided in an edge area of the shielding cover 59. In addition, a second guide opening can be fashioned in the shielding cover 59.

The invention is not limited to the particular details of the apparatus depicted and other modifications and applications are contemplated. Certain other changes may be made in the above described apparatus without departing from the true spirit and scope of the invention herein involved. It is intended, therefore, that the subject matter in the above depiction shall be interpreted as illustrative and not in a limiting sense.

CA 02276633 1999-06-19

WHAT IS CLAIMED IS:

1. A patch panel for connecting cables, comprising:
 - a front side, a back side, a plurality of openings, and at least one plug-in connector that is respectively fastened to the patch panel in accessible fashion, via one of the openings, from the front side of the patch panel for plugging of a mating plug-in connector;
 - a cable connection area on the back side of the patch panel that is allocated to each of the plug-in connectors; and
 - each of the plug-in connectors and the respective cable connection area is surrounded on all sides by an electromagnetic shielding.
2. The patch panel according to claim 1, wherein the shielding has at least one shielding cap that respectively encloses a plug-in connector and the respective associated cable connection area.
3. The patch panel according to claim 1, wherein an insert is arranged in each opening, in which insert a plug-in connector is respectively placeable from the front side of the patch panel, and wherein the insert is arranged inside the shielding.
4. The patch panel according to claim 3, wherein each of the plug-in connectors is held fast in the insert by a snap connection.

-18-





CA 02278833 1999-08-29

5. The patch panel according to claim 1, wherein the patch panel further comprises an angled sheet metal part with a front part that extends vertically on the front side of the patch panel and with a base part that extends horizontally on the back side of the patch panel, and wherein the openings are located in the front part and wherein the angled sheet metal part forms a part of the shielding.
6. The patch panel according to claim 5, wherein the patch panel further comprises between the front part and the base part a reinforcement part that extends on the back side of the patch panel for stabilization of the angled sheet metal part.
7. The patch panel according to claim 5, wherein the patch panel further comprises a front plate that presses the plug-in connectors onto the angled sheet metal part and that is fastened to the angled sheet metal part.
8. The patch panel according to claim 7, wherein the front plate is fastened to the angled sheet metal part by a snap connection.
9. The patch panel according to claim 1, wherein the patch panel further comprises at least one cable carrier on the back side as a support for a cable.
10. The patch panel according to claim 1, wherein the plug-in connector has at least one jack for receiving a plug on the front side of the patch panel and a terminal strip on the back side of the patch panel for fastening the leads of a cable in the cable connection area.



CA 02276633 1999-06-29

11. A socket comprising:
 - at least a front side and an interior;
 - at least one plug-in connector that is structured in accessible fashion in the socket through an opening on a front side of the socket for plugging of a mating plug-in connector;
 - a cable connection area in an interior of the socket; and
 - the plug-in connector and the cable connection area being surrounded on all sides by an electromagnetic shielding.
12. The socket according to claim 11, wherein the shielding has a shielding cover that is arranged on a back side of the socket.
13. The socket according to claim 11, wherein the socket further comprises an insert, into which the plug-in connector can be inserted from the front side of the socket through the opening, the insert being located inside the shielding.
14. The socket according to claim 13, wherein the plug-in connector is secured in the insert by a snap connection.
15. The socket according to claim 11, wherein the socket further comprises a sheet metal bent part as a part of the shielding.



CA 02276633 1999-06-29

16. The socket according to claim 15, wherein the sheet metal bent part is fastened to the socket by a snap connection.
17. The socket according to claim 15, wherein the sheet metal bent part is insertable into the socket from the front side of the socket .
18. The socket according to claim 15, wherein the sheet metal bent part has a device for securing a cable to the sheet metal bent part.
19. The socket according to claim 11, wherein the plug-in connector has at least one accessible jack for receiving a mating plug on the front side of the socket and a terminal strip on the back side of the socket for fastening leads of a cable in the cable connection area.
20. The socket according to claim 11, wherein the socket is constructed as a flush-type box.
21. A plug-in connector, comprising:
- at least one accessible jack for receiving a mating plug on a front side of the plug-in connector;
 - a terminal strip on a back side of the plug-in connector for fastening leads of a cable; and
 - a shielding plate.



CA 02276633 1999-06-29

22. The plug-in connector according to claim 21, wherein the plug-in connector further comprises a snap device for fastening the plug-in connector.
23. The plug-in connector according to claim 21, wherein the plug-in connector further comprises a jack part with at least one jack and a terminal strip part with the terminal strip, wherein the jack part and the terminal strip part are constructed as parts that are joinable and separable.
24. A plug-in connector according to claim 23, wherein the shielding plate is fastened to the jack part.
25. The plug-in connector according to claim 23, wherein the snap device is fashioned on at least one of the terminal strip part and the jack part.
26. A system for providing an electrical connection for transmission of data, comprising:
- a first cable that has a plurality of electrically conductive leads;
 - a socket with at least one plug-in connector fastened in the socket in accessible fashion, through an opening on a front side of the socket, for plugging of a mating plug-in connector;
 - a cable connection area in an interior of the socket;
 - the plug-in connector and the cable connection area being surrounded on all sides by an electromagnetic shielding;



CA 02276633 1999-06-29

leads of the first cable connected with the plug-in connector in the cable connection area of the socket;

a second cable with a plurality of electrically conductive leads and with a mating plug-in connector that is plugged into the plug-in connector of the socket at the front side;

a patch panel having a front side, a back side, a plurality of openings, and at least one plug-in connector that is respectively fastened to the patch panel in accessible fashion, from the front side of the patch panel via one of the openings, for plugging of a mating plug-in connector;

a cable connection area on the back side of the patch panel that is allocated to each of the plug-in connectors;

each of the plug-in connectors and the respective cable connection area surrounded on all sides by an electromagnetic shielding;

the leads of the second cable connected with one of the plug-in connectors of the patch panel in the cable connection area of the plug-in connector, or a second mating plug-in connector of the second cable plugged into a plug-in connector on the front side of the patch panel.

27. The system according to claim 26, wherein the plug-in connector of the patch panel and the plug-in connector of the socket have a common construction.



CA 02276633 1999-06-29

28. The patch panel according to claim 26, wherein the shielding has at least one shielding cap that respectively encloses a plug-in connector and the respective associated cable connection area.

29. The patch panel according to claim 26, wherein an insert is arranged in each opening, in which insert a plug-in connector is respectively placeable from the front side of the patch panel, and wherein the insert is arranged inside the shielding.

30. The patch panel according to claim 29, wherein each of the plug-in connectors is held fast in the insert by a snap connection.

31. The patch panel according to claim 28, wherein the patch panel further comprises an angled sheet metal part with a front part that extends vertically on the front side of the patch panel and with a base part that extends horizontally on the back side of the patch panel, and wherein the openings are located in the front part and wherein the angled sheet metal part forms a part of the shielding.

32. The patch panel according to claim 31, wherein the patch panel further comprises between the front part and the base part a reinforcement part that extends on the back side of the patch panel for stabilization of the angled sheet metal part.



CA 01276633 1999-06-29

33. The patch panel according to claim 31, wherein the patch panel further comprises a front plate that presses the plug-in connectors onto the angled sheet metal part and that is fastened to the angled sheet metal part.
34. The patch panel according to claim 33, wherein the front plate is fastened to the angled sheet metal part by a snap connection.
35. The patch panel according to claim 26, wherein the patch panel further comprises at least one cable carrier on the back side as a support for a cable.
36. The patch panel according to claim 26, wherein the plug-in connector has at least one jack for receiving a plug on the front side of the patch panel and a terminal strip on the back side of the patch panel for fastening the leads of a cable in the cable connection area.
37. The socket according to claim 26, wherein the shielding has a shielding cover that is arranged on a back side of the socket.
38. The socket according to claim 26, wherein the socket further comprises an insert, into which the plug-in connector can be inserted from the front side of the socket through the opening, the insert being located inside the shielding.



CA 01276633 1999-06-29

39. The socket according to claim 38, wherein the plug-in connector is secured in the insert by a snap connection.
40. The socket according to claim 26, wherein the socket further comprises a sheet metal bent part as a part of the shielding.
41. The socket according to claim 40, wherein the sheet metal bent part is fastened to the socket by a snap connection.
42. The socket according to claim 40, wherein the sheet metal bent part is insertable into the socket from the front side of the socket.
43. The socket according to claim 40, wherein the sheet metal bent part has a device for securing a cable to the sheet metal bent part.
44. The socket according to claim 26, wherein the plug-in connector has at least one accessible jack for receiving a mating plug on the front side of the socket and a terminal strip on the back side of the socket for fastening leads of a cable in the cable connection area.
45. The socket according to claim 26, wherein the socket is constructed as a flush-type box.



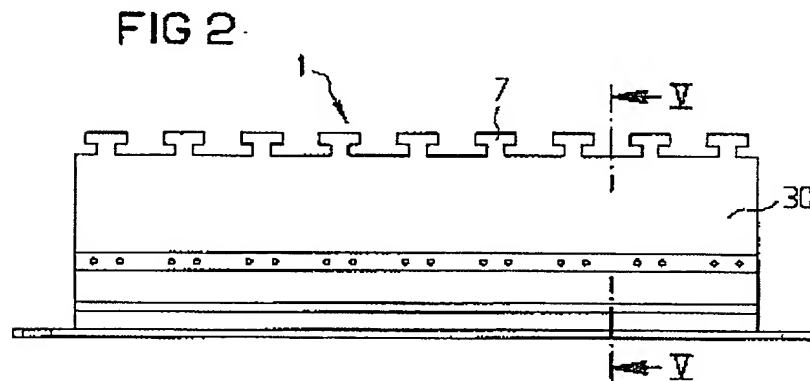
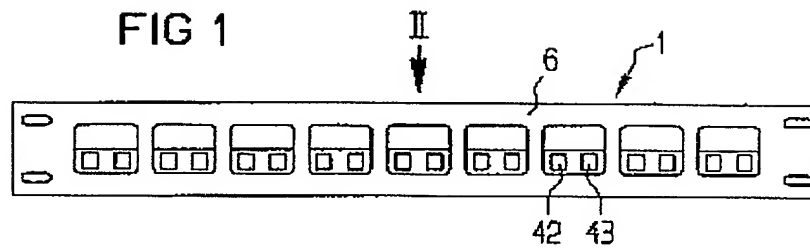
CA 02276633 1999-06-29

46. The system according to claim 26, wherein the plug-in connector has at least one accessible jack for receiving a mating plug on a front side of the plug-in connector, a terminal strip on a back side of the plug-in connector for fastening leads of a cable, and a shielding plate.
47. The system according to claim 46, wherein the plug-in connector has a snap device for fastening the plug-in connector.
48. The system according to claim 47, wherein the plug-in connector has a jack part with at least one jack and a terminal strip part with the terminal strip, and wherein the jack part and the terminal strip part are constructed as parts that are joinable and separable.
49. The system according to claim 48, wherein the shielding plate is fastened to the jack part.
50. The system according to claim 48, wherein the snap device is fashioned on at least one of the terminal strip part and the jack part.

CRISTINA L. L. L.
OTTAWA, ONTARIO
PATENT AGENTS

CA 02276633 1999-06-29

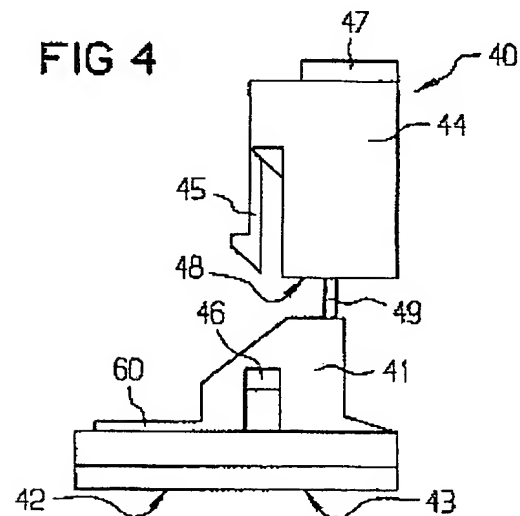
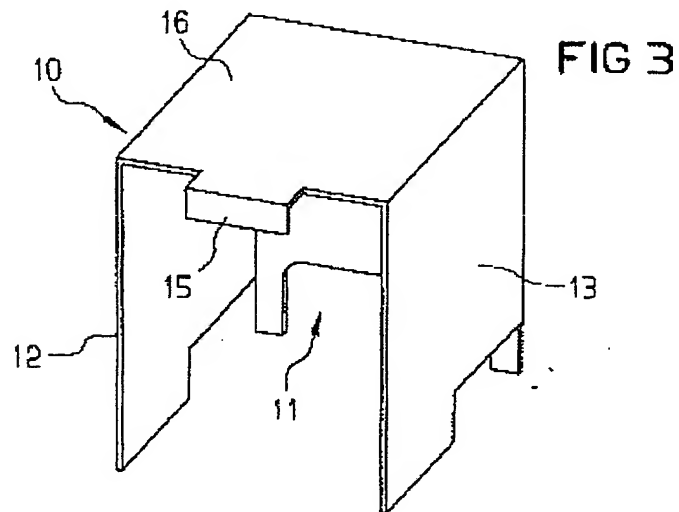
1/5





CA 02276633 1999-06-29

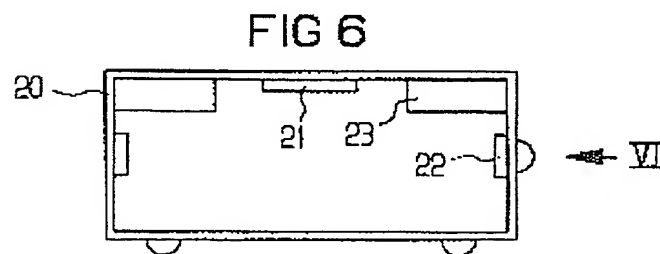
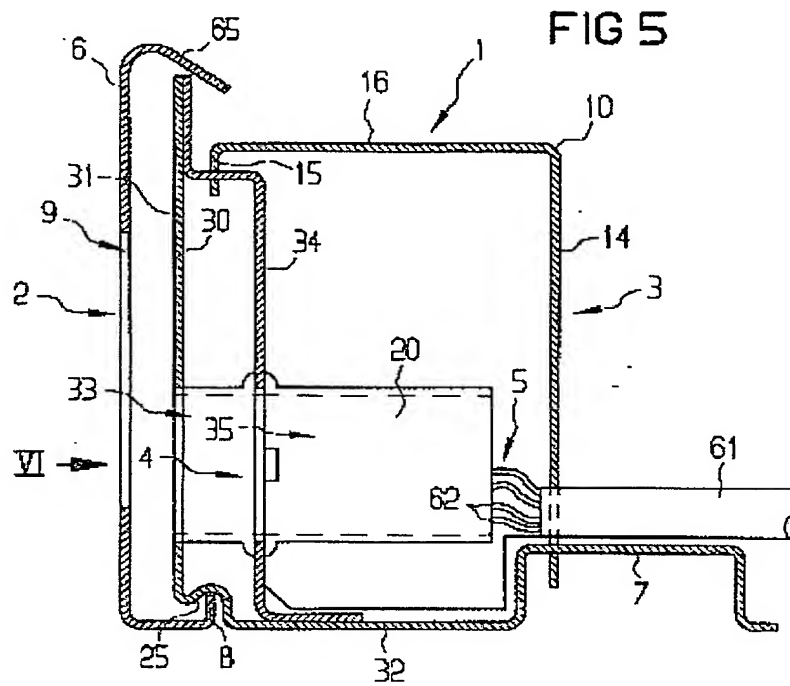
2/5





CA 02276633 1999-06-29

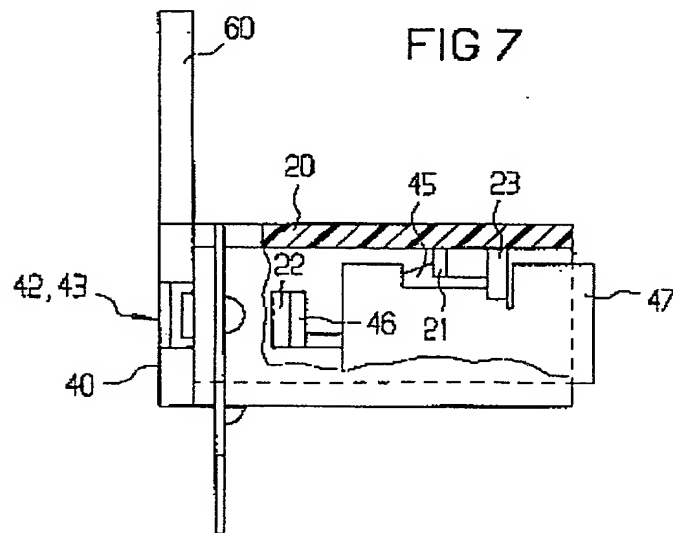
3/5





CA 02276633 1999-06-29

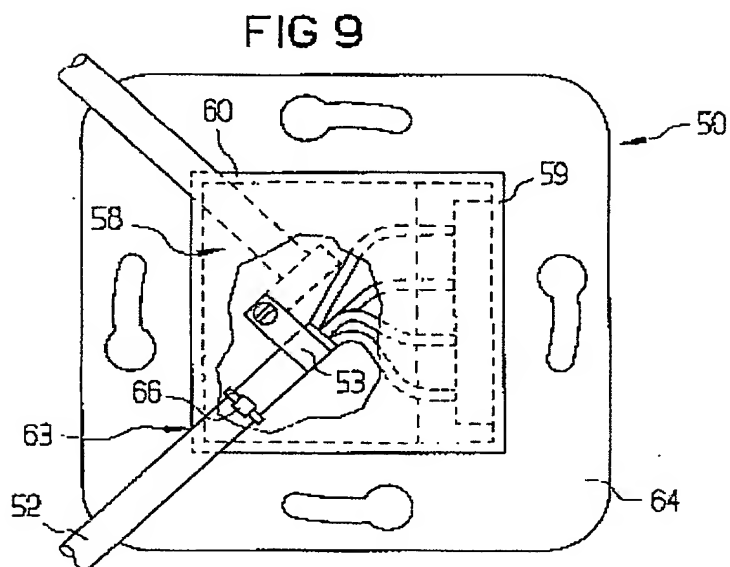
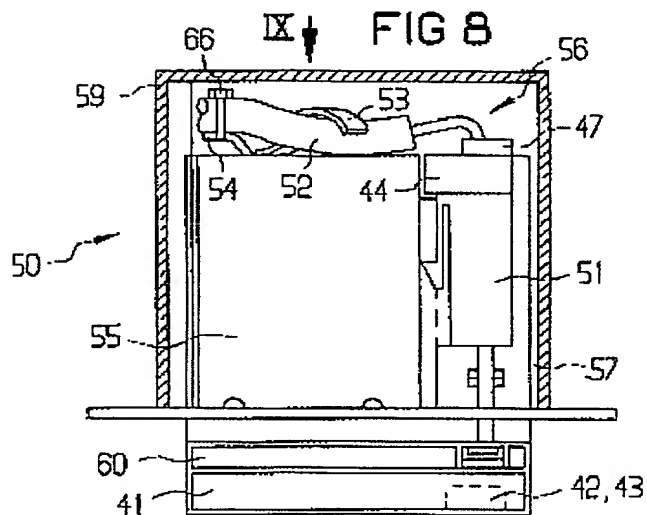
4/5





CA 02276633 1999-06-29

5/5





Canadian Intellectual
Property Office

Office de la propriété
intellectuelle du Canada

Canada

Français
Strategis

Contact Us
Site Map

Help
What's New

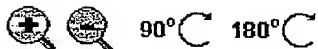
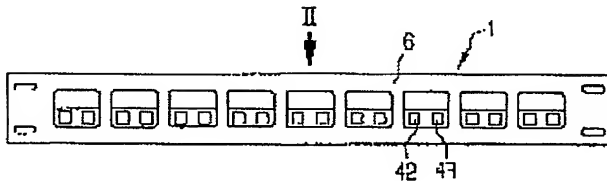
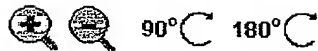
Search
About Us

Canada Site
Registration



Fetching images from archive...

The image pages will appear below. On browsers that support it, this message is in a new window. Using your browser's "Back" button on this new window may not work as expected. When you are done viewing this patent, close or resize this window to reveal the original window underneath.



**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☒ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.